CASE STUDY /

Ansys + Rheinmetall

Rheinmetall Leverages Ansys Tools to Streamline and Optimize Automotive Product Design.

"Rheinmetall is convinced by the advantages performing CAE-based variants analysis. They are indispensable part of continuous CAE workflows starting at topology optimization and end up in robustness evaluations. Ansys optiSLang hosts key capabilities of those workflows that enable early innovative designs and significant performance improvements of up to 45% compared to reference design. We also appreciate the benefits with regard to development efficiency by applying such straightforward methods."

Jessica Tamasi
Staff Engineer, Computer-Aided Optimization / Rheinmetall AG

CASE STUDY

Rheinmetall as a global acting technology group in the segment security and mobility is confronted with the industry's well-known constant pressure from customers to further increase performance as well as quality while simultaneously raising development efficiency. This challenges the development process, and to fulfill both demands, extensive use of simulation is required to support decision-making. In particular, there is a need for simulation-driven design exploration and optimization. To realize the targeted design improvements a profound product understanding is the base to successfully optimize design performance, quality and costs.

CHALLENGES

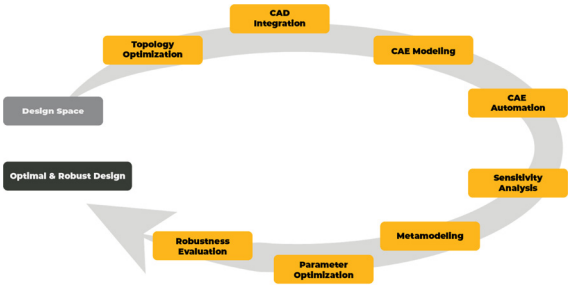
Central simulation department of Rheinmetall's mobility area supports all Division's Business Units as the internal CAE service supplier, executing a broad spectrum of CAE tasks to support the development teams expanding and improving company's extensive product portfolio, which ranges from parts for internal combustion engines to parts for hybrid and electrical vehicles. Needing to streamline design optimization throughout their processes and develop optimal and robust designs, the team uses optiSLang to perform sensitivity analysis, surrogate modeling, parameter optimization and robustness evaluation.

TECHNOLOGY USED

- Ansys optiSLang
- Ansys Workbench
- Ansys Electronics Desktop

ENGINEERING SOLUTION

Inspired by the idea of simulation driven design optimization, Rheinmetall performs CAE variants analysis in various development projects. optiSLang supports setup and execution of customized CAE workflows on the one hand side and provides required analysis tools and algorithms on the other side to create following results:



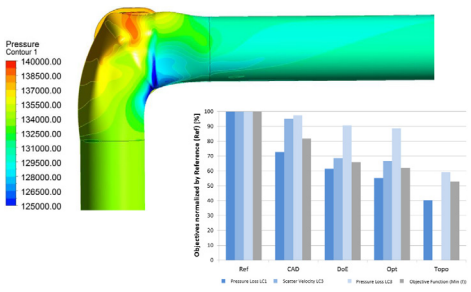
Continuous Workflow from Topology Optimization to Robustness Evaluation

- Obtaining a system-based understanding of designs under variability as fundament for efficient part development.
- Disclosing optimization potential and determining operating limits.
- Receiving optimized and robust designs.

Convinced by optiSLang technology, Central simulation department of Rheinmetall deployed collaborative efforts to introduce optiSLang across the company, expanding the software's usage from pilot projects to broad usage in multiple CAE disciplines over the last six years. Next, Rheinmetall will expand optiSLang's international usage, and launch an innovative service platform to internal customers thanks to optiSLang web-service.

BENEFITS

Simulation-driven design optimization simultaneously reduces development cost and time and optimizes design performance according to requirements, using all available design freedom. Early design studies, which are an indispensable part of simulation-driven design optimization, provide the development team with frontloading advantages and deliver a complete view on feasibility, risks and costs. This significantly reduces the number of required prototypes.

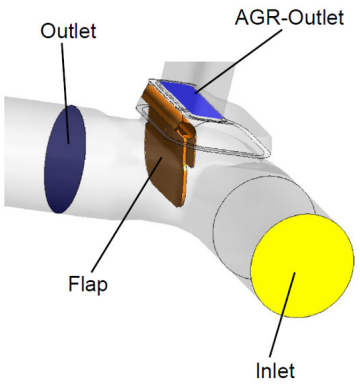


Result of continuous optimization workflow application on EGR flap valve flow volume

RHEINMETALL

COMPANY DESCRIPTION

Rheinmetall AG, publicly listed and based in Düsseldorf, Germany, is a powerful, internationally successful corporation. As an integrated technology group, Rheinmetall is a market leader in the areas of environmentally friendly mobility and threat-appropriate security technology. Rheinmetall commands a foremost position as a global first-tier supplier to the automotive industry for modules and systems. Furthermore, Rheinmetall is Europe's foremost supplier of defence and security technology and a longstanding partner of the armed forces.



EGR Flow chamber - Flap valve

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